
SystemCORP ENERGY

IED Configurator

User Manual

This PDF Document contains internal hyperlinks for ease of navigation.
For example, click on any item listed in the [Table of Contents](#) to go to that page.

- [General Description](#)
 - [ICD Designer User Guide](#)
-

Copyright: All rights reserved. None of the information contained in this document may be reproduced or stored in a database or retrieval system or disclosed to others without written authorization by SystemCORP Energy Pty Ltd.

The information in this document is subject to change without prior notice and should not be construed as a commitment by SystemCORP Energy Pty Ltd. SystemCORP Energy Pty Ltd do not assume responsibility for any errors, which may be in this document.

Documentation Control

Author:	Daniel Jones
Revision:	1.00
Revision History:	1.00 - Release PL
Creation Date:	26 November 2015
Last Revision Date:	18 October 2018
Product Reference:	196-000
Document Status:	DRAFT

Table of Contents

1	Introduction.....	4
1.1	Scope	4
1.2	Overview	4
1.2.1	Document Reference	4
1.2.2	List of Abbreviations	5
2	General Description.....	7
2.1	SystemCORP IED Configurator Overview	7
2.2	Settings Tabs Overview	8
2.3	IED Configurator Workflow.....	9
2.4	IED Communications Information	10
2.5	IED Configurator Files and Revert Settings	11
3	IED Configurator User Guide.....	12
3.1	Connecting to the IED	12
3.2	Access Points.....	15
3.3	Data Sets.....	16
3.3.1	Logical Node View.....	16
3.3.2	Creating a Data Set.....	16
3.3.3	Edit Data Set View	17
3.4	Report Controls	18
3.4.1	Logical Node View.....	18
3.4.2	Creating a Report Control Block	18
3.4.3	Edit Report Control Block View	19
3.5	Log Controls	25
3.5.1	Logical Node View.....	25
3.5.2	Creating a Log Control Block	25
3.5.3	Edit Log Control Block View	26
3.6	GOOSE Controls.....	29
3.6.1	Logical Node View.....	29
3.6.2	Creating a GOOSE Control Block	30
3.6.3	Edit GOOSE Control Block View.....	30
3.7	External References.....	32
3.7.1	Creating an External Reference	34
3.7.2	External IED Manager	35

1 Introduction

This document describes the use of SystemCORP's Intelligent Electronic Device (IED) Configurator Tool. The IED Configurator tool is used to reconfigure IEC61850 on an IED during installation or when the IED's requirements change. It can be used to select which information is sent by the IED to other IEC61850 devices or clients. IED configurator can also be used to update the address information of the IED and other IED's to which the device may subscribe.

1.1 Scope

This document is divided into 2 major sections:

- **Overview** with **General Description** that includes a list of abbreviation using IEC 61850 in IED's; and a brief guide to using IED configurator.
- **User Guide** that walks through the process of using IED configurator in depth.

The International Electro-technical Commission (IEC) 61850 specification details are beyond the scope of this document. See the IEC 61850 specification document titles listed in the next section.

1.2 Overview

1.2.1 Document Reference

This document is used with the SystemCORP ICD Designer Studio .

- [1] Document Title: SystemCORP ICD Designer User Manual
Revision: Version 1.00 English
Author: SystemCORP
Source: SystemCORP
- [2] International Electro-technical Commission (IEC) Document Titles:
Source: IEC Publications
 - IEC 61850-1 Introduction and overview
 - IEC 61850-2 Glossary
 - IEC 61850-3 General requirements
 - IEC 61850-4 System and project management
 - IEC 61850-5 Communication requirements for functions and device models
 - IEC 61850-6 Configuration description language for communication in electrical substations related to IED's
 - IEC 61850-7-1 Basic communication structure for substation and feeder equipment – Principles and models
 - IEC 61850-7-2 Basic communication structure for substation and feeder equipment – Abstract communication service interface (ACSI)
 - IEC 61850-7-3 Basic communication structure for substation and feeder equipment – Common data classes

- IEC 61850-7-4 Basic communication structure for substation and feeder equipment
 - Compatible logical node classes and data classes
- IEC 61850-8-1 Specific communication service mapping (SCSM)
 - Mappings to MMS (ISO/IEC 9506-1 and ISO/IEC 9506-2) and to ISO/IEC 8802-3
- IEC 61850-9-1 Specific communication service mapping (SCSM)
 - Sampled values over serial unidirectional multi-drop point-to-point link
- IEC 61850-9-2 Specific communication service mapping (SCSM)
 - Sampled values over ISO/IEC 8802-3 2
- IEC 61850-10 Conformance testing
- IEC 61850-80-1 Ed. 1.0 Communication networks and systems for power utility automation
 - Part 80-1: Guideline to exchange information from a CDC based data model using IEC 60870-5-101/104

1.2.2 List of Abbreviations

<i>ACSI</i>	= <i>Abstract Communication Service Interface</i>
<i>ASDU</i>	= <i>Application Service Data Unit</i>
<i>BRCB</i>	= <i>Buffered Report Control Block</i>
<i>CDC</i>	= <i>Common Data Class</i>
<i>CID</i>	= <i>Configured IED Description</i>
<i>Com</i>	= <i>Communication</i>
<i>DA</i>	= <i>Data Attribute</i>
<i>DAT</i>	= <i>Data Attribute Type</i>
<i>DO</i>	= <i>Data Object</i>
<i>DS</i>	= <i>Data Set</i>
<i>DTD</i>	= <i>Document Type Definition</i>
<i>FC</i>	= <i>Functional Constraint</i>
<i>GI</i>	= <i>General Interrogation</i>
<i>GoCB</i>	= <i>GOOSE Control Block</i>
<i>GOOSE</i>	= <i>Generic Object Oriented Substation Events</i>
<i>GSE</i>	= <i>Generic Substation Event</i>
<i>GSSE</i>	= <i>Generic Substation Status Event</i>
<i>GsCB</i>	= <i>GSSE Control Block</i>
<i>ICD</i>	= <i>IED Capability Description</i>
<i>IEC</i>	= <i>International Electro-technical Commission</i>
<i>IED</i>	= <i>Intelligent Electronic Device</i>
<i>IP</i>	= <i>Internet Protocol</i>
<i>LC</i>	= <i>Logical Connection</i>
<i>LCB</i>	= <i>Log Control Block</i>
<i>LD</i>	= <i>Logical Device</i>
<i>LN</i>	= <i>Logical Node</i>
<i>MC</i>	= <i>Multi-Cast</i>
<i>MCAA</i>	= <i>Multicast Application Association</i>

<i>MMS</i>	= <i>Manufacturing Message Specification (ISO 9506 series)</i>
<i>MSVCB</i>	= <i>Multicast Sampled Value Control Block</i>
<i>OSI</i>	= <i>Open System Interconnection</i>
<i>PC</i>	= <i>Physical Connection</i>
<i>PD</i>	= <i>Physical Device</i>
<i>PICOM</i>	= <i>Piece of Information for COMmunication</i>
<i>SAV</i>	= <i>Sampled Analogue Value (IEC 61850-9 series)</i>
<i>SBO</i>	= <i>Select Before Operate with normal security</i>
<i>SBOw</i>	= <i>Select Before Operate With enhanced security</i>
<i>SCD</i>	= <i>Substation Configuration Description.</i>
<i>SCL</i>	= <i>Substation Configuration Language</i>
<i>SCSM</i>	= <i>Specific Communication Service Mapping</i>
<i>SG</i>	= <i>Setting Group</i>
<i>SGCB</i>	= <i>Setting Group Control Block</i>
<i>SN</i>	= <i>SubNetworkName</i>
<i>SSD</i>	= <i>System Specification Description</i>
<i>SV</i>	= <i>Sampled Values</i>
<i>SVC</i>	= <i>Sampled Value Control</i>
<i>TCP</i>	= <i>Transport Control Protocol</i>
<i>TP</i>	= <i>Two Party</i>
<i>TPAA</i>	= <i>Two Party Application Association</i>
<i>TrgOp</i>	= <i>Trigger Option</i>
<i>URCB</i>	= <i>Unbuffered Report Control Block</i>
<i>USVCB</i>	= <i>Unicast Sampled Value Control Block</i>
<i>WDS</i>	= <i>eNode Designer project file extension</i>
<i>WDX</i>	= <i>WebCAN Designer studio XML</i>
<i>XML</i>	= <i>eXtensible Markup Language</i>

2 General Description

2.1 SystemCORP IED Configurator Overview

Upon startup of IED configurator, only the *Connect* button will be available to the user. Once connected to an IED, IED configurator will appear as below, with all options available.

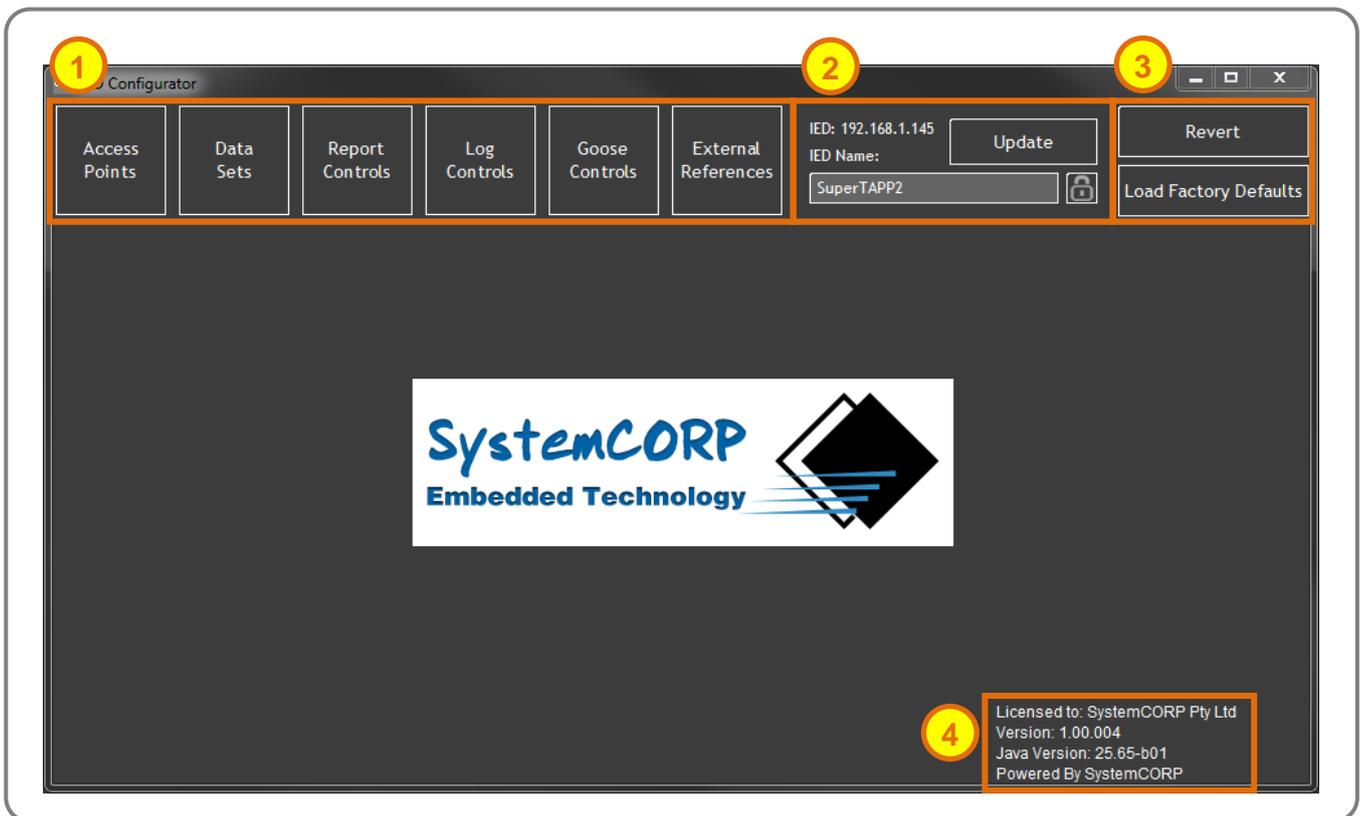


Figure 2-1 – SystemCORP ICD Configurator Main View

- 1 Settings Tabs** – Left clicking these tabs will lead to the relevant settings sections where settings can be edited. There is a brief overview of these settings in [2.2 Settings Tabs Overview](#) they are discussed in detail in [3 IED Configurator User Guide](#).
- 2 IED Communications Information** – This section contains a summary of information on the IED being configured, including *IED IP address*, *IED Name* and password information. This section also contains an *Update Device* button. This section is discussed further in [2.4 IED Communications Information](#).
- 3 Revert Options** – These buttons allow the user to revert the IED settings back to their condition prior to the most recent update or to the factory defaults. Use of these buttons is discussed further in [2.5 IED Configurator Files and Revert Settings](#).
- 4 License Information** – This section shows who the copy of IED configurator is licensed too and what version is running.

2.2 Settings Tabs Overview

Below is a brief overview of the settings available through the different settings tabs of IED configurator. For a more detailed description of each setting tab see the relevant section in 3 [IED Configurator User Guide](#).

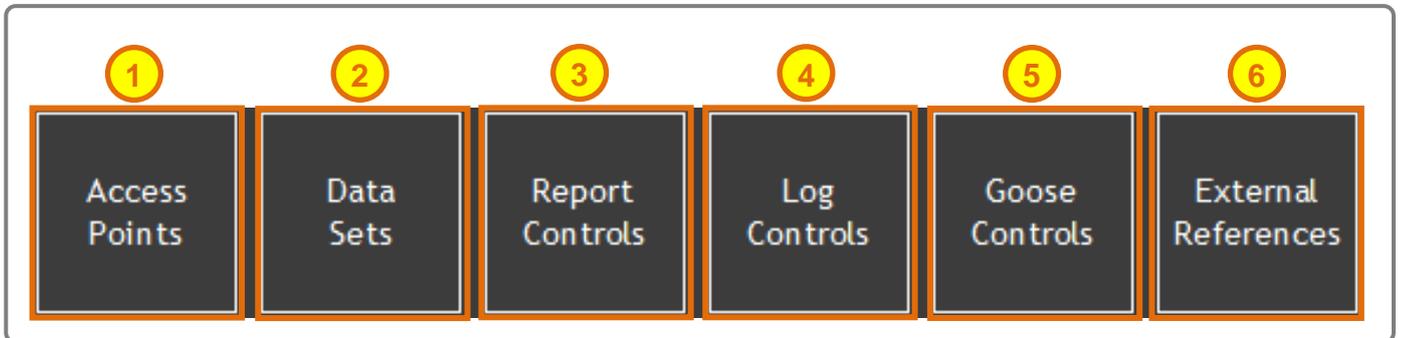
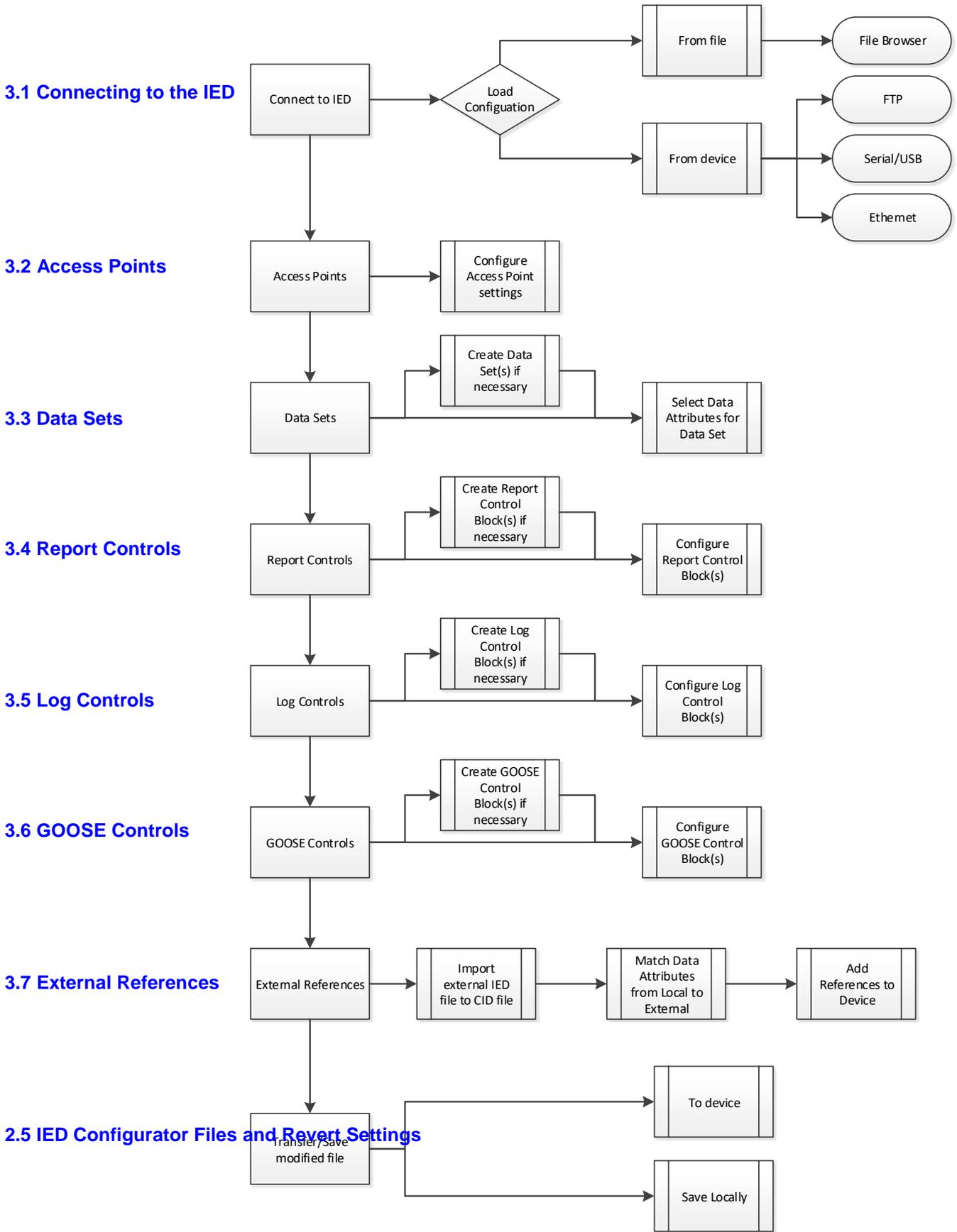


Figure 2-2 – Settings Tab Overview

- 1 Access Points** – These settings allow the address of the IED to be set as well as the addresses of other IEDs to which this IED is subscribing. Access points can be defined using this configuration option.
- 2 Data Sets** – These are collections of *Data Attributes* in the IEC 61850 server model, which are referenced by a *Report Control*, *Log Control* or *Goose Control*. *Data Sets* can be created with this function.
- 3 Report Controls** – These generate and send a report from an IEC 61850 server via MMS when *Data Attributes* change in the selected data set. *Report Controls* need to be configured here.
- 4 Log Controls** – These generate log entries in a file of the IEC 61850 server when *Data Attributes* change in the selected *Data Set*. This can be defined here.
- 5 Goose Controls** – These publish changes from the IEC 61850 server via GOOSE broadcast when *Data Attributes* change in the selected *Data Set*. This configuration option allows the user to configure the behaviour of GOOSE publishing.
- 6 External references** – These allow *Data Attributes* published by other IEDs to be mapped to *Data Attributes* in the IEC 61850 server of this IED. This causes the IED's mapped *Data Attribute* to be set when an update is received via GOOSE. External references can only be used if the relay is subscribed to another IED. One external reference can be mapped only to one internal reference.

2.3 IED Configurator Workflow



3.1 Connecting to the IED

3.2 Access Points

3.3 Data Sets

3.4 Report Controls

3.5 Log Controls

3.6 GOOSE Controls

3.7 External References

2.5 IED Configurator Files and Revert Settings

2.4 IED Communications Information

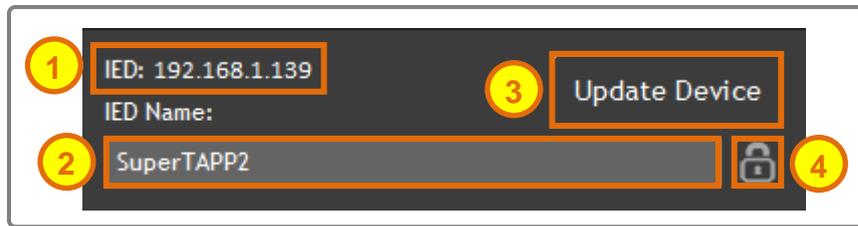


Figure 2-3 - IED Communications Information

- 1** **IED** – Shows the IP address, ftp address or local file name for the IED configuration.
- 2** **IED name** – The name of the IED can be modified here.
- 3** **Update Device** – This button will update the *Working File* with the current settings from *IED Configurator*. This will also display the message “*Configuration Saved to: WorkingFile.CID*”
- 4** **Device Password** – This button will bring up a dialogue box that allows the device password to be changed. In order for the device password to be changed, the current password, new password and a confirmation of the new password must be entered.

2.5 IED Configurator Files and Revert Settings

IED configurator requires two ICD files on the IED, the *Working File* and the *Factory Defaults File*.

Note: When selecting a local file or file from an FTP location the factory defaults file will not be used.

The Working File – The IEC61850 server is configured with this ICD file. All changes by IED Configurator are written to this file.

The Factory Defaults File – This is the ICD file containing the factory defaults. This file is never changed. It is used as a backup in the case the technician wishes to remove all changes made to the working file and start again.

These files are specified in the `IEDConfigurator.config` file on the IED:

```
# ICD file working path. Path to working copy. (default: ICDWorkingFilePath=config/XML/IED1.CID)
```

```
ICDWorkingFilePath=../Config/XML/IED1.CID
```

```
# ICD file template path. Path to default / backup copy. (default: ICDTemplateFilePath=config/XML/Default.CID)
```

```
ICDTemplateFilePath=../Config/XML/Default.CID
```

► Note: When the IED is shipped, the *Working File* should be an exact copy of the *Factory Defaults* file.

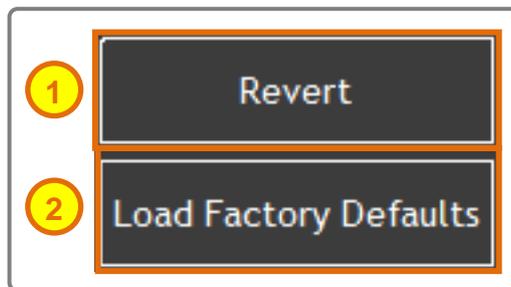


Figure 2-4 - Revert Settings

- 1 Revert** – When the device is updated, changes are saved to the *Working File*. When pressed, this button will revert the project settings to their state prior to latest update to the device, from the *Working File*. *IED Configurator* will also display the message “Loaded file: WorkingFile.CID”
- 2 Load Factory Defaults** – This button will load the settings from the *Factory Defaults* file into *IED Configurator*. This file does not change and its settings will always be available for the user to obtain. *IED Configurator* will also display the message “Loaded file: FactorySettings.CID”

3 IED Configurator User Guide

3.1 Connecting to the IED

Upon start-up of IED configurator, the *Connect* button is the only button available to the User.



Figure 3-1 - Connect Button on Startup

- 1 Connect Button** – This is the only button available on start-up, left click to begin the connection process.

When *Connect* is clicked, the following dialogue box is shown to configure the connection of the IED. Sections here may be disabled by the OEM.

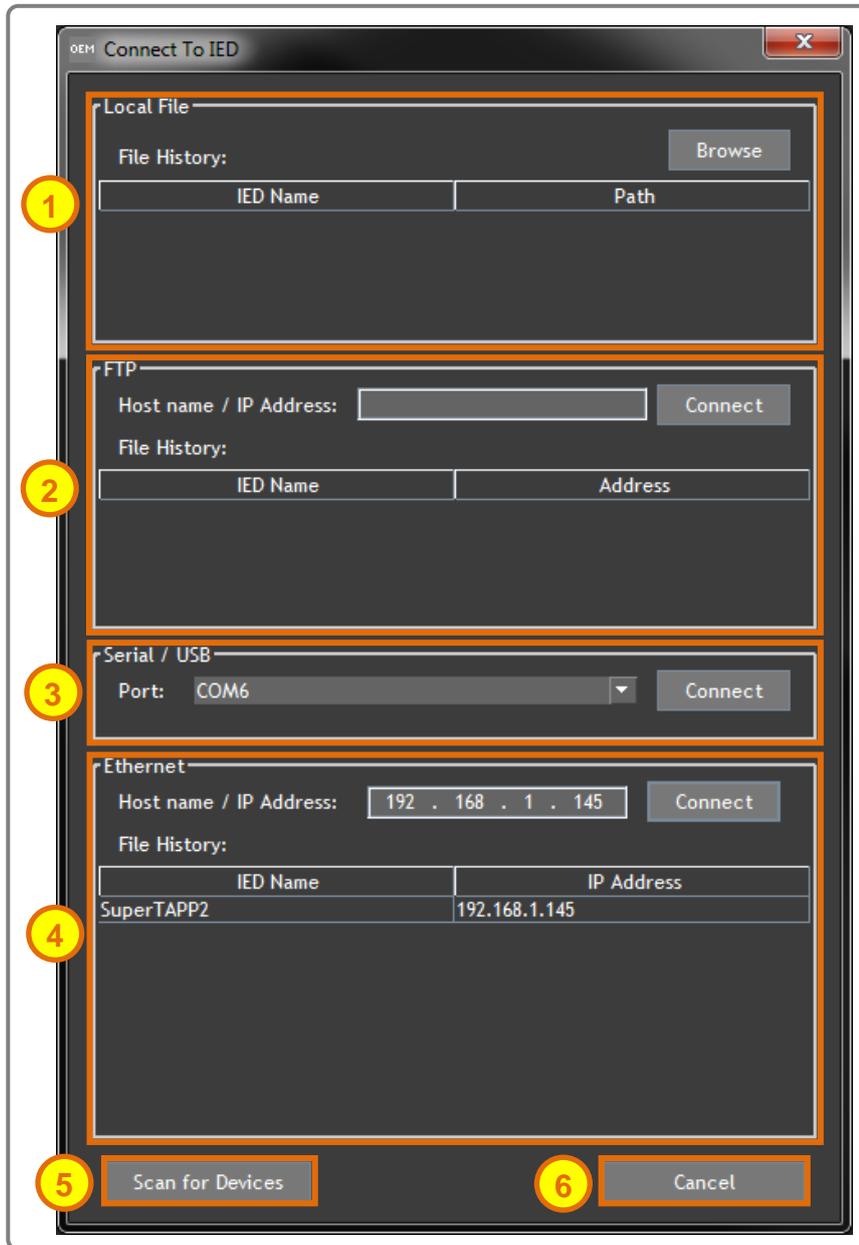


Figure 3-2 - Connect to IED dialogue box

- 1 Local File** – This section is used to load an IED file from a local directory. Left clicking the browse button will bring up a file browser where the relevant file can be found and selected. When the file has been found within the browser window. Clicking open will immediately exit the *Connect To IED* window and open the file for configuration.
- 2 FTP** – This section is used to load an IED file via FTP. Enter a host name or IP and left click connect. This will display a dialog to allow a file to be selected from the FTP server.
- 3 Serial/USB** – This section is used when the IED is connected via Serial or USB. Select the relevant port from the drop down menu and click connect.

- 4** **Ethernet** – This section is used to connect to a device via Ethernet. Enter the relevant IP address and left click connect. All previously connected devices will be saved with their last known IP address, this information is shown under *Connection History*. Double left click to immediately connect to a device in the *Connection History* list or alternatively, a single left click on a device in the list will place the IP address in the *IP Address* field, clicking *Connect* will then connect to that device.
- 5** **Scan for Devices** – This button will scan both the serial ports and local network for available devices.
- 6** **Cancel** – Cancels the connection attempt and returns to the main view.

3.2 Access Points

These settings allow the address of the IED to be set as well as the addresses of other IEDs to which this IED is subscribing. Access points can be defined using this configuration option.

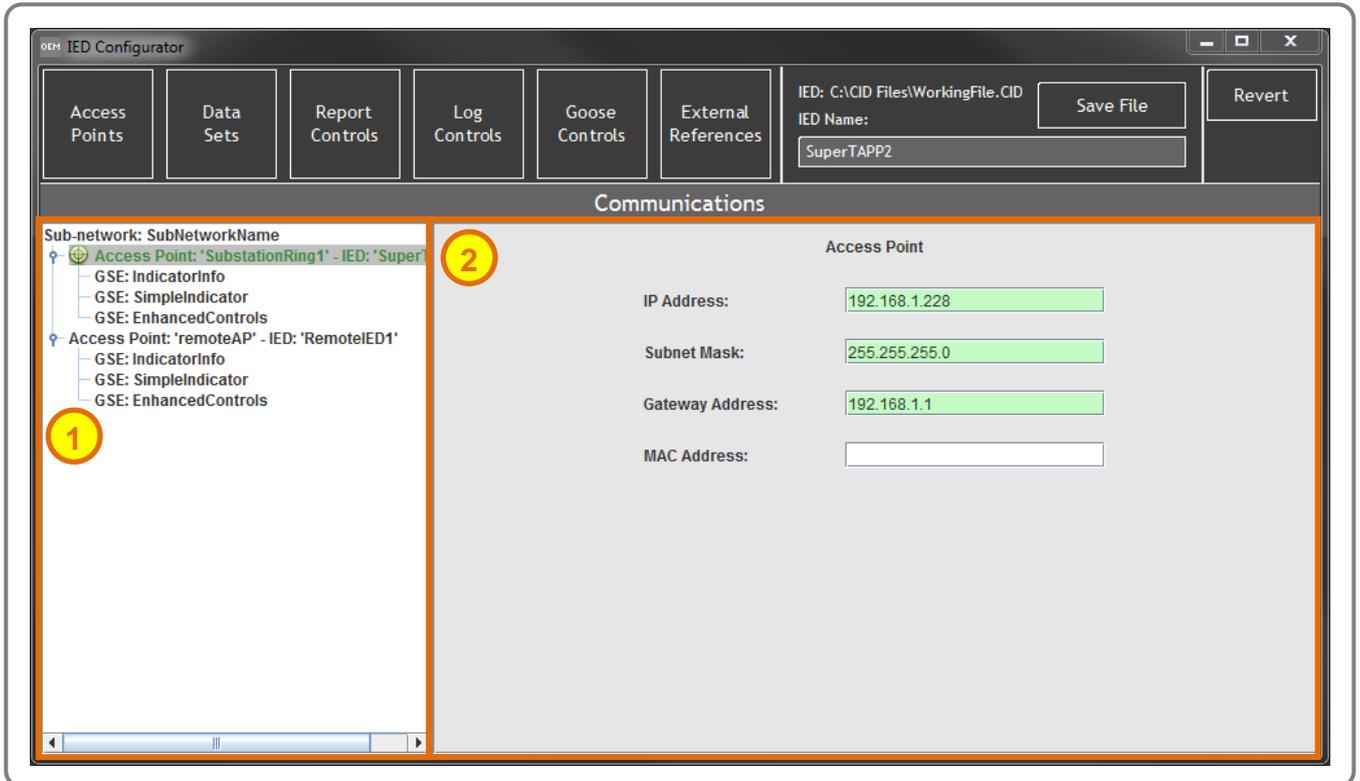


Figure 3-3 - Access Points

- 1
Subnetwork Tree – This section displays the various access points within the IED’s subnetwork, including IEDs to which the relay is subscribed. The access point for the connected IED will appear in green with a target icon.
- 2
Access Point Settings – This section contains the various settings relevant to the access point selected from the *Subnetwork Tree*.

Once settings have been changed. Left click *Update Device* to save the new configuration to the working copy or continue configuring the device. If settings are invalid, they will show in red as opposed to green.

► **Note:** Only change MAC addresses if they have been changed in the software operating system on any device.

3.3 Data Sets

Data Sets are collections of *Data Attributes* in the IEC 61850 server model, which are referenced by a *Report Control*, *Log Control* or *Goose Control*. *Data Sets* can be created, edited and deleted within the *Data Sets* settings view, this is accessible by left clicking the *Data Sets* button. A view similar to the following will be displayed when a *Logical Node*, within the IED, is left clicked in the *IED Structure Tree*. In the following example “Logical Node: LLNO” has been selected.

3.3.1 Logical Node View

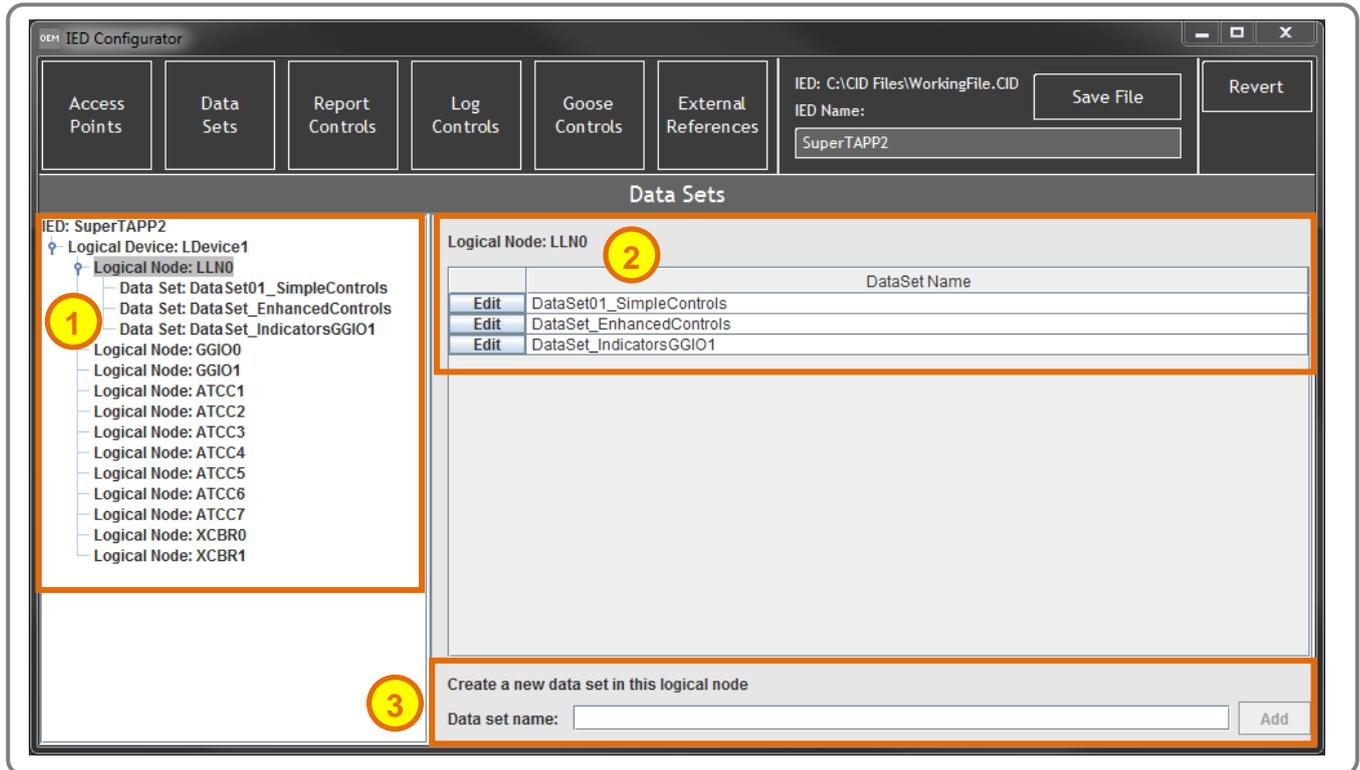


Figure 3-4 - Data Set Logical Node View

- 1 **IED Structure Tree** – This section displays the various *Logical Devices*, *Logical Nodes* and *Data Sets* within the IED. This can be used to find *Data Sets* within the IED for editing.
- 2 **Data Sets List** – This section contains a list of the *Data Sets* found within the selected *Logical Node*. Along the left side of each *Data Set* listed, is an *Edit* button. Left clicking this will select the relevant *Data Set* from within the *IED Structure Tree* and open the *Edit Data Set* view. There is more information on the *Edit Data Set* view in [3.3.3 Edit Data Set View](#).
- 3 **Create New Data Set** – This section can be used to create a new data set in the selected *Logical Node*. It is discussed further in [3.3.2 Creating a Data Set](#).

3.3.2 Creating a Data Set

To create a new *Data Set*, left click the *Logical Node* chosen as the intended *Data Set* destination from the *IED Structure Tree* in the *Data Sets* settings view (Refer to [Figure 3-4 - Data Set Logical Node View](#)). Type the desired name in the *Data Set* name box and left click *Add* to create a new *Data Set*. This new *Data Set* will then

appear in the *Data Set List* above. Left clicking *Edit* in this view will go to the *Edit Data Set* view and allow for the selection of *Data Attributes* to include in the *Data set*. This is discussed further in [3.3.3 Edit Data Set View](#).

3.3.3 Edit Data Set View

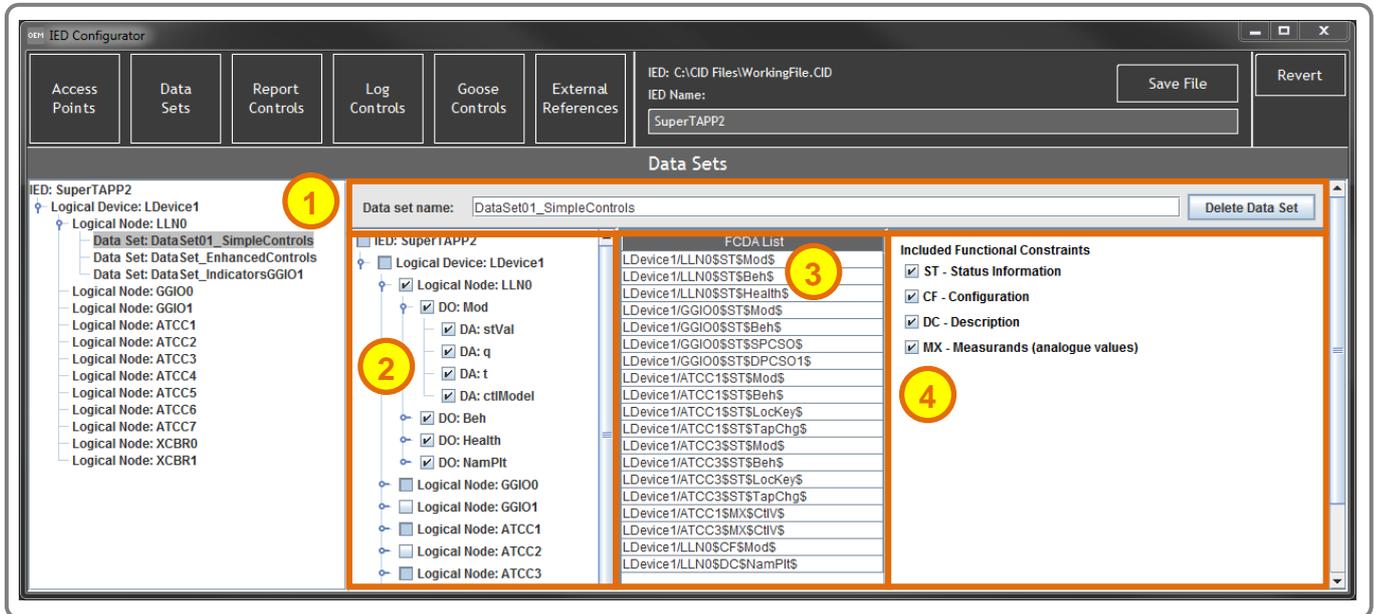


Figure 3-5 - Edit Data Set View

- 1 Data Set Information** – This section contains a field to edit the *Data Set* name, this is updated in the *IED Structure Tree* live. There is also an option to delete the *Data Set*. Left click *Delete Data Set* to do so. This will immediately delete the *Data Set* without confirmation.
- 2 Data Attribute Structure Tree** – This section contains a tree structure of the *Data Attributes* available to *Data Sets* and can be used to select the relevant *Data Attributes* for inclusion in a *Data Set*. The tree is split into several levels, from top to bottom, *IED*, *Logical Devices*, *Logical Nodes*, *Data Objects* and *Data Attributes*. By left clicking one of the checkboxes, this will include everything within that section (if a tick is displayed). If for example, a *Logical Device* is selected, all *Logical Nodes*, *Data Objects* and *Data Attributes* within it, would be included in the *FCDA* list.
- 3 FCDA List** – This section is the full list of included *Functionally Constrained Data Attributes* within the *Data Set*. Each attribute is listed in a manner that shows it's corresponding *Logical Device*, *Logical Node*, and *Data Object*. This list is the list of *Data Attributes* within the *Data Set*. It can be altered by either selecting/deselecting attributes in the *Data Attribute Structure Tree* and by filtering the already selected *Data Attributes* by selecting/deselecting *Functional Constraints Filters*.
- 4 Functional Constraints Filter** – This section can be used to filter the *FCDA* list of certain types of *Data Attributes*. In the above example, all functional constraints are selected, however if *Description* was deselected, this would remove all *Data Attributes* related to the *Description* from the *FCDA* list.

3.4 Report Controls

Report Control Blocks generate and send a report from an IEC 61850 server via MMS when *Data Attributes* change in the selected data set. *Report Control Blocks* can be created, edited and deleted within the *Report Control Blocks* settings view, this is accessible by left clicking the *Report Controls* button. A view similar to the following will be displayed when a *Logical Node*, within the IED, is left clicked in the *IED Structure Tree*. In the following example “Logical Node: LLNO” has been selected.

This view appears and functions in a manner very similar to the equivalent view in *Data Sets*.

3.4.1 Logical Node View

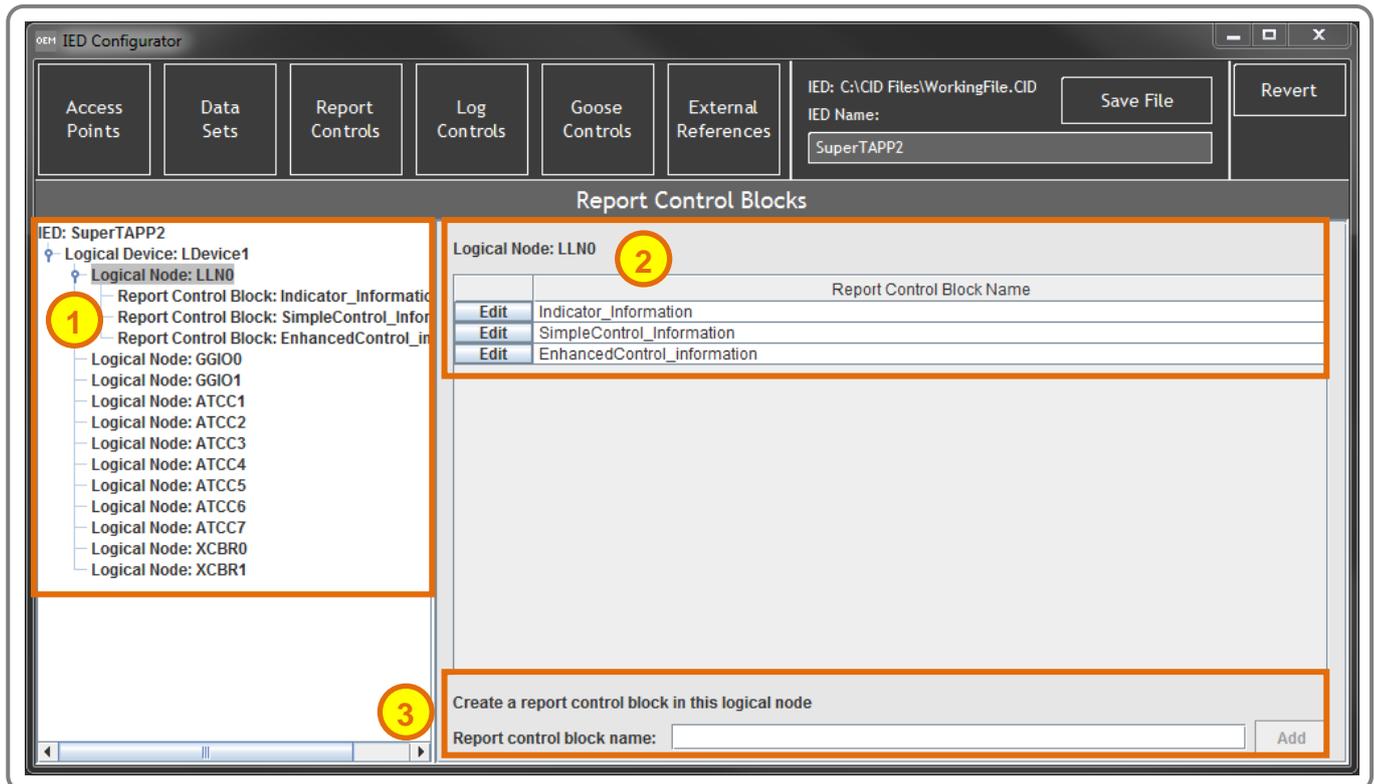


Figure 3-6 – Report Controls Logical Node View

- 1 **IED Structure Tree** – This section displays the various *Logical Devices*, *Logical Nodes* and *Report Control Blocks* within the IED. This can be used to find *Report Control Blocks* within the IED for editing.
- 2 **Report Control Block List** – This section contains a list of the *Report Control Blocks* found within the selected *Logical Node*. Along the left side of each *Report Control Block* listed, is an *Edit* button. Left clicking this will select the relevant *Report Control Block* from within the *IED Structure Tree* and open the *Edit Report Control Block* view. There is more information on the *Edit Report Control Block* view in [3.4.3 Edit Report Control Block View](#).
- 3 **Create a New Report Control Block** – This section can be used to create a new *Report Control Block* in the selected *Logical Node*. It is discussed further in [3.4.2 Creating a Report Control Block](#).

3.4.2 Creating a Report Control Block

To create a new *Report Control Block*, left click the *Logical Node* chosen as the intended *Report Control Block* destination from the *IED Structure Tree* in the *Report Controls* settings view (Refer to [Figure 3-6 – Report Controls Logical Node View](#)). Type the desired name in the *Report Control Block* name box and left click *Add* to

create a new *Report Control Block*. This new *Report Control Block* will then appear in the *Report Control Block List* above. Left clicking *Edit* in this view will go to the *Edit Report Control Block* view where its settings can be configured. This is discussed further in [3.4.3 Edit Report Control Block View](#).

3.4.3 Edit Report Control Block View

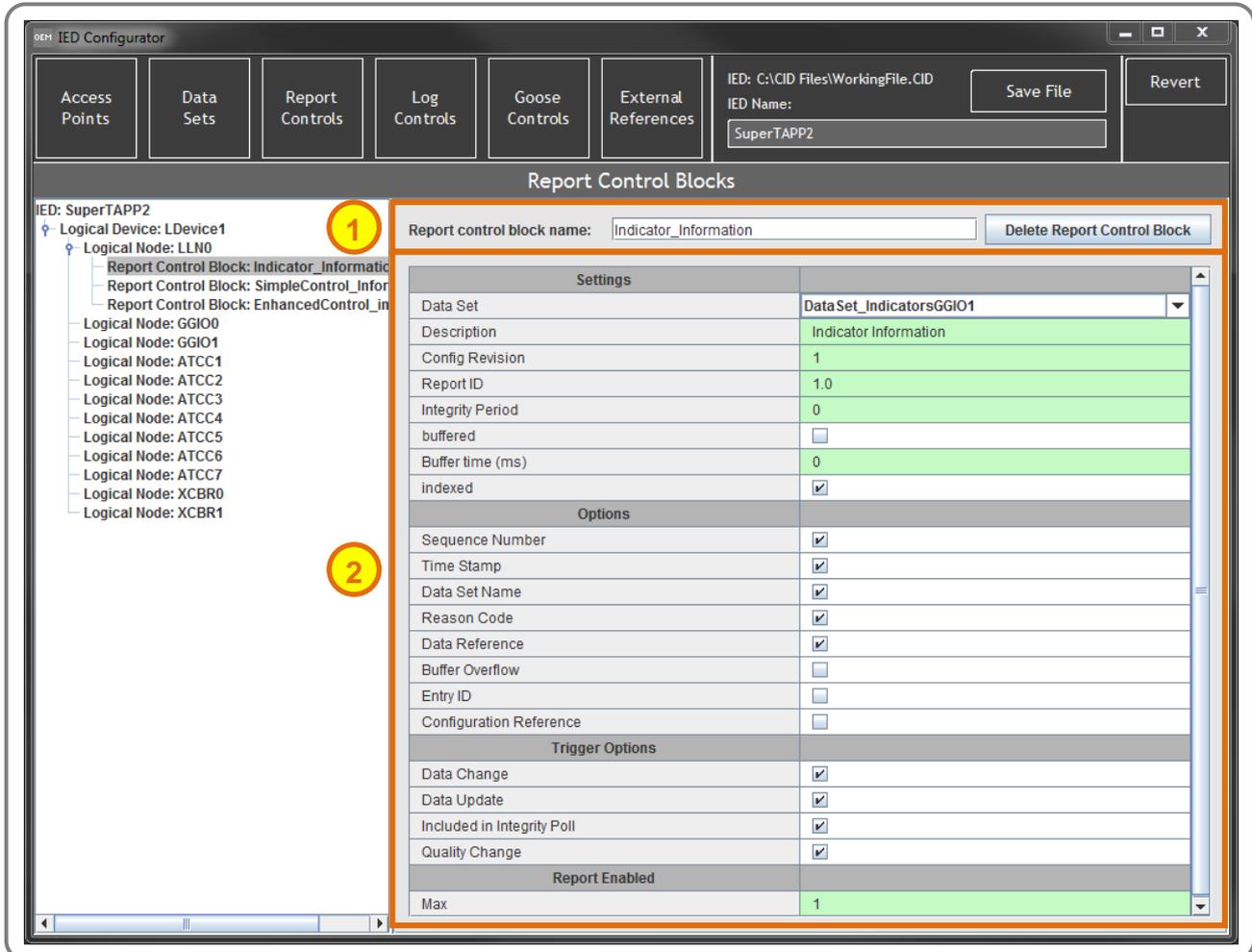


Figure 3-7 – Report Controls

- 1 Report Control Block Information** – This section contains a field to edit the *Report Control Block* name, this is updated in the *IED Structure Tree* live. There is also an option to delete the *Report Control Block*. Left click *Delete Report Control Block* to do so. This will immediately delete the *Report Control Block* without confirmation.
- 2 Report Control Block Settings** – This section contains the relevant settings for the selected *Report Control Block*. Most of the settings within this section are changed using a checkbox. Left clicking will toggle the setting on or off. Other settings can be edited using either a drop down menu or manually entering a value. More information on individual settings can be found on the next page.

3.4.3.1 Data Set

Description	Set of data assigned to the GOOSE control block
Data Entry	Drop Down menu
Range	<i>Includes any data set shown within the drop down menu.</i>
Input Option	Mandatory

3.4.3.2 Description

Description	Report Control Block Description
Data Entry	Data Entry
Range	<i>User Text</i>
Input Option	Optional

3.4.3.3 Config Revision

Description	Configuration Revision
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Mandatory

3.4.3.4 Report ID

Description	Report ID
Data Entry	Data Entry
Range	<i>User Text</i>
Input Option	Mandatory

3.4.3.5 Integrity Period

Description	Integrity Period
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Mandatory

3.4.3.6 Buffered

Description	Enable buffered report
Data Entry	Check Box
Range	<i>YES or NO</i>
Input Option	N/A

3.4.3.7 Buffer Time (ms)

Description	Buffer time in milliseconds
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Optional

3.4.3.8 Indexed

Description	Enable report control block instance indexing
Data Entry	Check Box
Range	<i>YES or NO</i>
Input Option	N/A

3.4.3.9 Sequence Number

Description	Include sequence number in report
Data Entry	Check Box
Range	<i>YES or NO</i>
Input Option	N/A

3.4.3.10 Time Stamp

Description	Include time stamp in report
Data Entry	Check Box
Range	<i>YES or NO</i>
Input Option	N/A

3.4.3.11 Data Set Name

Description	Include data set name in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.12 Reason Code

Description	Include reason code in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.13 Data Reference

Description	Include data reference in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.14 Buffer Overflow

Description	Include buffer overflow notification in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.15 Entry ID

Description	Include entry ID in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.16 Configuration Reference

Description	Include configuration reference in report
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.17 Data Change

Description	Send report when data in data set is changed
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.18 Data Update

Description	Send report when data in data set is updated
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.19 Included in Integrity Poll

Description	Send report on integrity period
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.20 Quality Change

Description	Send report when quality in data set is changed
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.4.3.21 **Max**

Description	Maximum Enabled Reports
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Mandatory/Optional

3.5 Log Controls

Log Control Blocks generate log entries in a file of the IEC 61850 server when *Data Attributes* change in the selected *Data Set*. *Log Control Blocks* can be created, edited and deleted within the *Log Control Blocks* settings view, this is accessible by left clicking the *Log Controls* button. A view similar to the following will be displayed when a *Logical Node*, within the IED, is left clicked in the *IED Structure Tree*. In the following example “Logical Node: LLNO” has been selected.

This view appears and functions in a manner very similar to the equivalent view in *Data Sets* and *Report Controls*.

3.5.1 Logical Node View

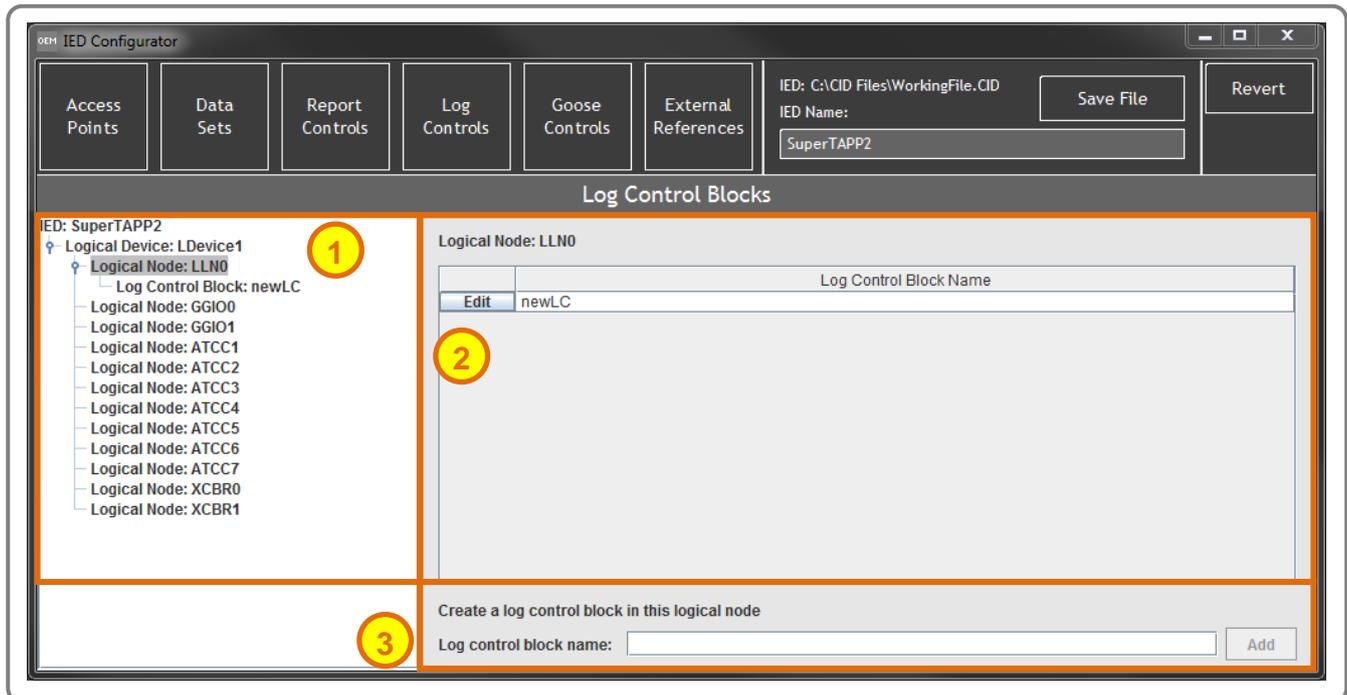


Figure 3-8 – Log Controls Logical Node View

- 1 **IED Structure Tree** – This section displays the various *Logical Devices*, *Logical Nodes* and *Log Control Blocks* within the IED. This can be used to find *Log Control Blocks* within the IED for editing.
- 2 **Log Control Block List** – This section contains a list of the *Log Control Blocks* found within the selected *Logical Node*. Along the left side of each *Log Control Block* listed, is an *Edit* button. Left clicking this will select the relevant *Log Control Block* from within the *IED Structure Tree* and open the *Edit Data Set* view. There is more information on the *Edit Log Control Block* view in [3.5.3 Edit Log Control Block View](#).
- 3 **Create a New Log Control Block** – This section can be used to create a new *Log Control Block* in the selected *Logical Node*. It is discussed further in [3.5.2 Creating a Log Control Block](#).

3.5.2 Creating a Log Control Block

To create a new *Log Control Block*, left click the *Logical Node* chosen as the intended *Log Control Block* destination from the *IED Structure Tree* in the *Log Controls* settings view (Refer to [Figure 3-8 – Log Controls Logical Node View](#)). Type the desired name in the *Log Control Block Name* box and left click *Add* to create a new *Log Control Block*. This new *Log Control Block* will then appear in the *Log Control Block List* above. Left clicking *Edit* in this view will go to the *Edit Log Control Block* view where its settings can be configured. This is discussed further in [3.5.3 Edit Log Control Block View](#).

3.5.3 Edit Log Control Block View

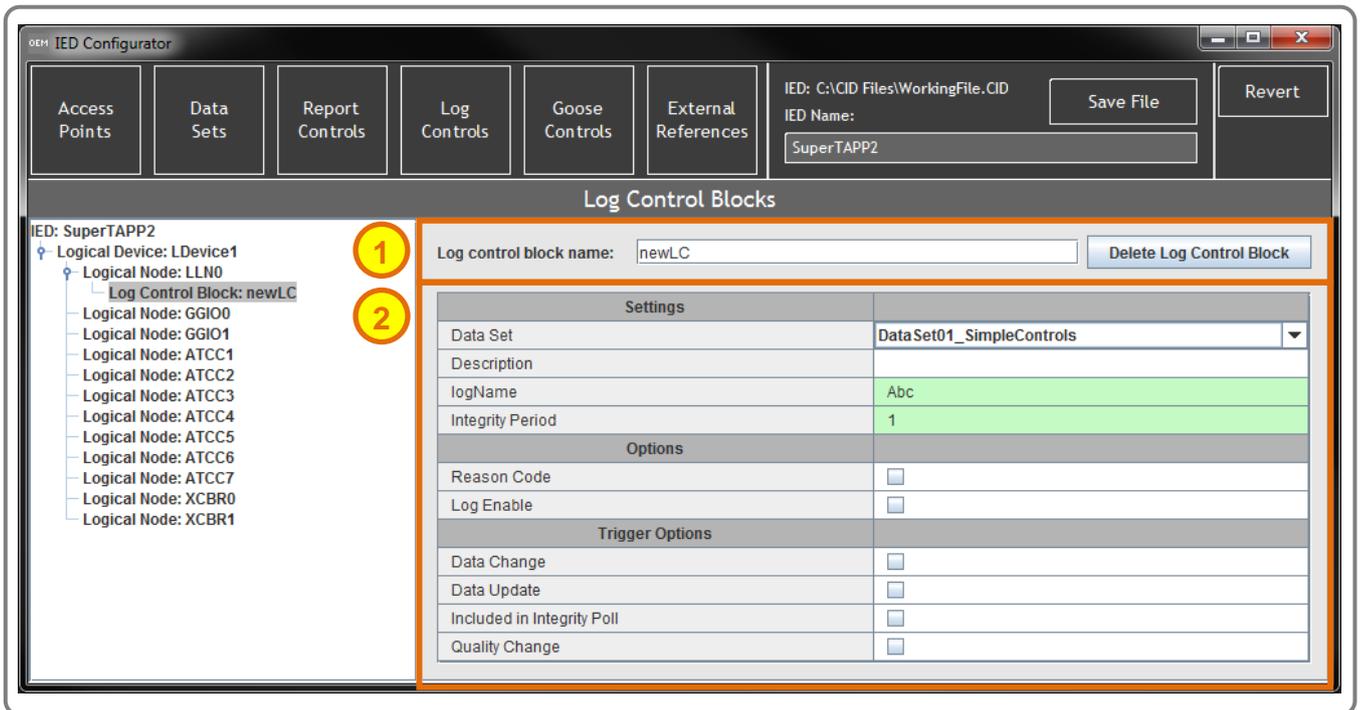


Figure 3-9 – Log Controls

- 1 Log Control Block Information** – This section contains a field to edit the *Log Control Block* name, this is updated in the *IED Structure Tree* live. There is also an option to delete the *Log Control Block*. Left click *Delete Log Control Block* to do so. This will immediately delete the *Log Control Block* without confirmation.
- 2 Log Control Block Settings** – This section contains the relevant settings for the selected *Log Control Block*. Most of the settings within this section are changed using a checkbox. Left clicking will toggle the setting on or off. Other settings can be edited using either a drop down menu or manually entering a value. More information on individual settings can be found on the next page.

3.5.3.1 Data Set

Description	Set of data assigned to the GOOSE control block
Data Entry	Drop Down menu
Range	<i>Includes any data set shown within the drop down menu.</i>
Input Option	Mandatory

3.5.3.2 Description

Description	Description of Log Control Block
Data Entry	Data Entry
Range	<i>User Text</i>
Input Option	Optional

3.5.3.3 logName

Description	Log Name
Data Entry	Data Entry
Range	<i>User Text</i>
Input Option	Optional

3.5.3.4 Integrity Period

Description	Integrity Period in Milliseconds
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Mandatory

3.5.3.5 Reason Code

Description	Include reason code in log output
Data Entry	Check Box
Range	<i>YES or NO</i>
Input Option	N/A

3.5.3.6 Log Enable

Description	Enable Log Output
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.5.3.7 Data Change

Description	Output log when data in data set is changed
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.5.3.8 Data Update

Description	Output log when data in data set is updated
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.5.3.9 Included in Integrity Poll

Description	Output log on integrity period
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.5.3.10 Quality Change

Description	Output log when quality in data set is changed
Data Entry	Check Box
Range	YES or NO
Input Option	N/A

3.6 GOOSE Controls

GOOSE Controls publish changes from the IEC 61850 server via GOOSE broadcast when *Data Attributes* change in the selected *Data Set*. *GOOSE Control Blocks* can be created, edited and deleted within the *GOOSE Control Blocks* settings view, this is accessible by left clicking the *GOOSE Controls* button. A view similar to the following will be displayed when a *Logical Node*, within the IED, is left clicked in the *IED Structure Tree*. In the following example “Logical Node: LLNO” has been selected.

This view appears and functions in a manner very similar to the equivalent view in *Data Sets*, *Report Controls* and *Log Controls*.

3.6.1 Logical Node View

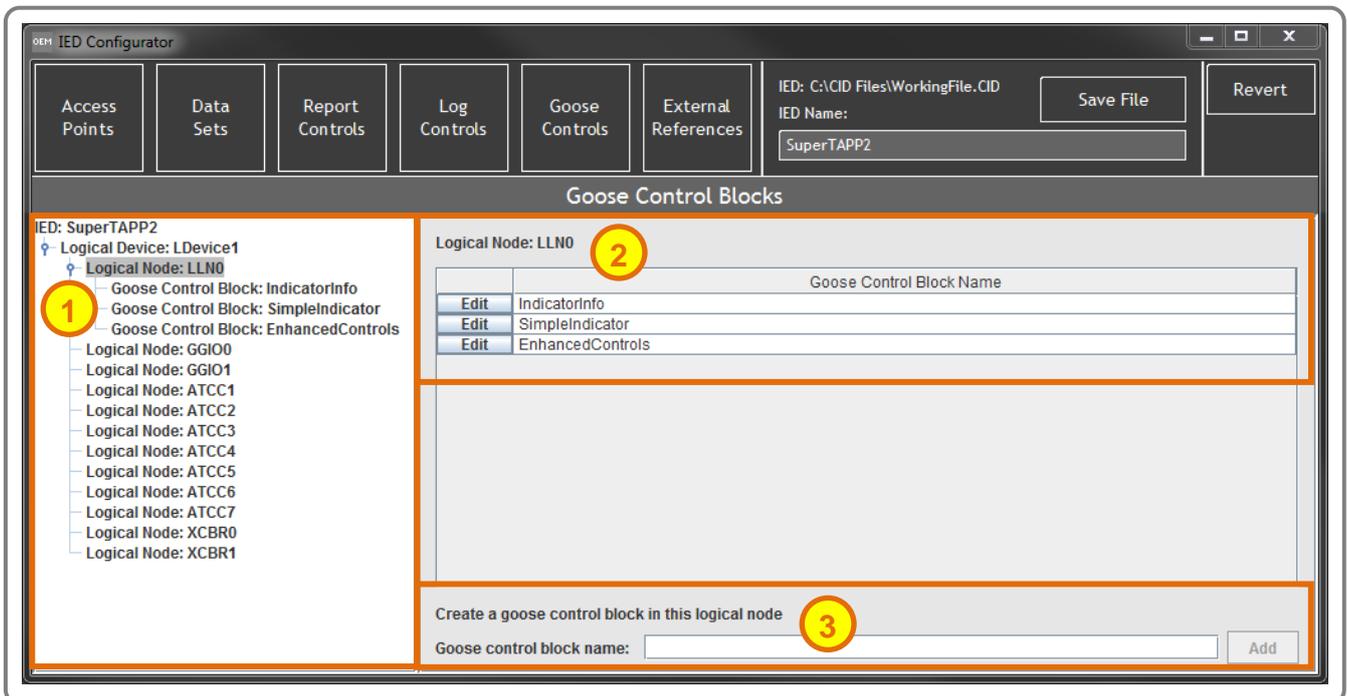


Figure 3-10 – GOOSE Controls Logical Node View

- 1 **IED Structure Tree** – This section displays the various *Logical Devices*, *Logical Nodes* and *GOOSE Control Blocks* within the IED. This can be used to find *GOOSE Control Blocks* within the IED for editing.
- 2 **GOOSE Control Block List** – This section contains a list of the *GOOSE Control Blocks* found within the selected *Logical Node*. Along the left side of each *GOOSE Control Block* listed, is an *Edit* button. Left clicking this will select the relevant *GOOSE Control Block* from within the *IED Structure Tree* and open the *Edit Data Set* view. There is more information on the *Edit GOOSE Control Block* view in [3.6.3 Edit GOOSE Control Block View](#).
- 3 **Create a New GOOSE Control Block** – This section can be used to create a new *GOOSE Control Block* in the selected *Logical Node*. It is discussed further in [3.6.2 Creating a GOOSE Control Block](#).

3.6.2 Creating a GOOSE Control Block

To create a new *GOOSE Control Block*, left click the *Logical Node* chosen as the intended *GOOSE Control Block* destination from the *IED Structure Tree* in the *GOOSE Controls* settings view (Refer to [Figure 3-10 – GOOSE Controls Logical Node View](#)). Type the desired name in the *GOOSE Control Block Name* box and left click *Add* to create a new *GOOSE Control Block*. This new *GOOSE Control Block* will then appear in the *GOOSE Control Block List* above. Left clicking *Edit* in this view will go to the *Edit GOOSE Control Block* view where its settings can be configured. This is discussed further in [3.6.3 Edit GOOSE Control Block View](#).

3.6.3 Edit GOOSE Control Block View

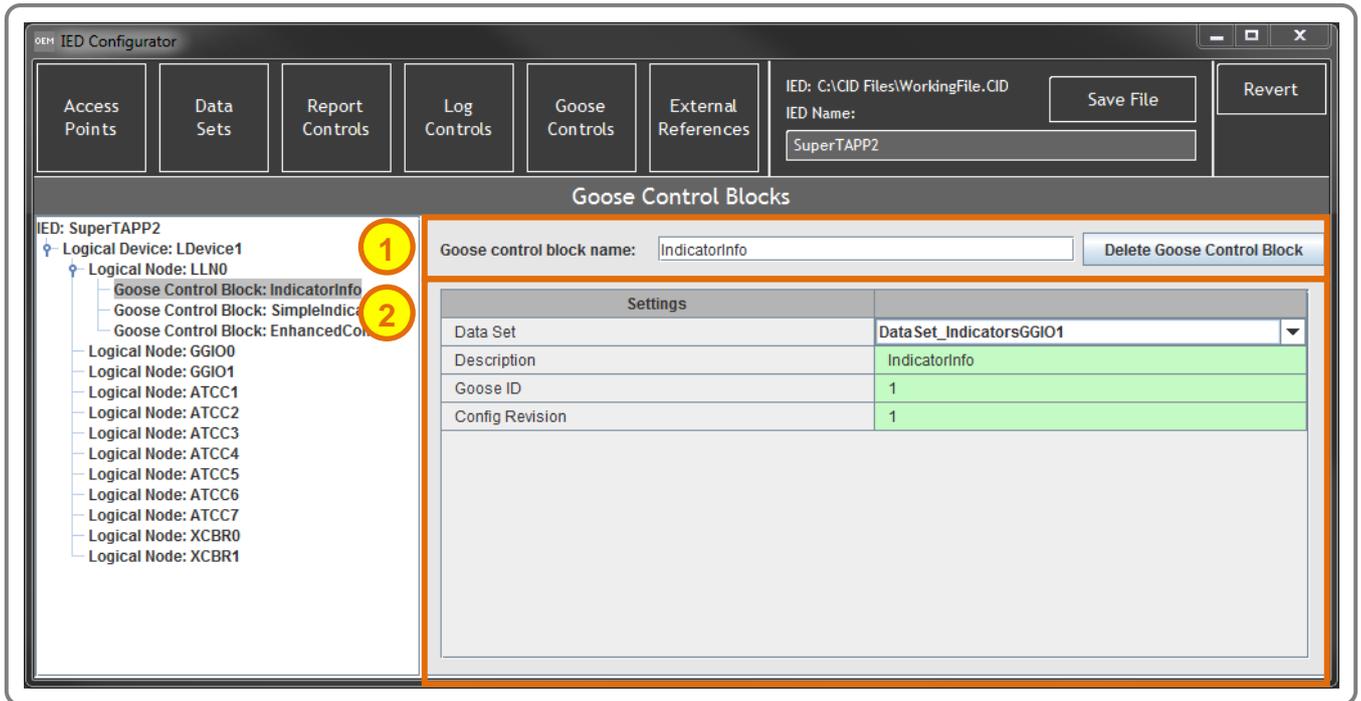


Figure 3-11 – GOOSE Controls

- 1** **GOOSE Control Block Information** – This section contains a field to edit the *GOOSE Control Block* name, this is updated in the *IED Structure Tree* live. There is also an option to delete the *GOOSE Control Block*. Left click *Delete GOOSE Control Block* to do so. This will immediately delete the *GOOSE Control Block* without confirmation.
- 2** **GOOSE Control Block Settings** – This section contains the relevant settings for the selected *GOOSE Control Block*. Settings can be edited using either a drop down menu or manually entering a value. More information on individual settings can be found on the next page.

3.6.3.1 Data Set

Description	Set of data assigned to the GOOSE control block
Data Entry	Drop Down menu
Range	<i>Includes any data set shown within the drop down menu.</i>
Input Option	Mandatory

3.6.3.2 Description

Description	Description of Goose Control Block
Data Entry	Data Entry
Range	<i>User Text</i>
Input Option	Optional

3.6.3.3 GOOSE ID

Description	Goose ID
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Mandatory

3.6.3.4 Config Revision

Description	Configuration revision number
Data Entry	Data Entry
Range	<i>32 Bit Unsigned Integer</i>
Input Option	Optional

3.7 External References

External References allow *Data Attributes* published by other IEDs using GOOSE broadcast data to be mapped to *Data Attributes* in the IEC 61850 server of this IED. This causes the IED's mapped *Data Attribute* to be set when an update is received via GOOSE. External references can only be used if the IED is subscribed to another IED. One external reference can be mapped only to one internal reference.

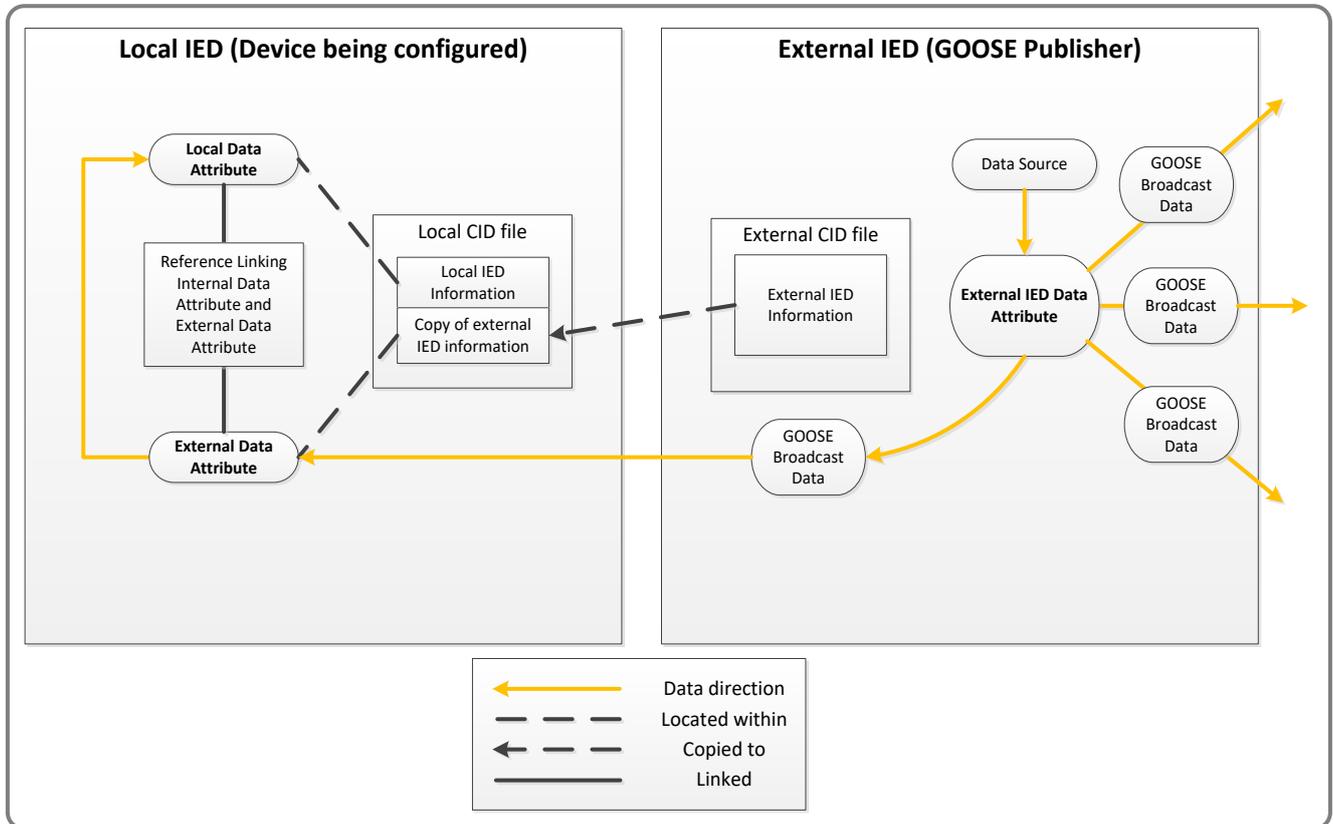


Figure 3-12 - External References

- The local .cid file being configured by *IED Configurator* must contain a copy of the IED information of any External IEDs that are referenced.
- This copy will contain any *Data Attributes* from the External IED.
- *Internal Data Attributes* can now be linked to *External Data Attributes* of the same type found within the External IED information of the Local .cid file.
- Once a reference has been created for two data attributes, the local copy of the *External Data Attribute* will be updated by the GOOSE broadcast data of the actual *External IED Data Attribute*, which in turn will update the local *Data Attribute* that it is referenced to.

The *External References* section only has one view. This view is split into three main sections. *Local Device*, *External IED* and a *Reference List*.

To create an external reference, a *Data Attribute* from the Local device must be matched to the relevant *Data Attribute* on an external device. Once these two attributes have been matched. The reference can be created and added to the local device. More information is found in [3.7.1 Creating an External Reference](#).

For External References to be utilized, a copy of the external IED must be saved to the CID file being configured by IED configurator. This can be done by using the *External IED Manager* option in *External References*. Information on how to use this can be found in [3.7.2 External IED Manager](#).

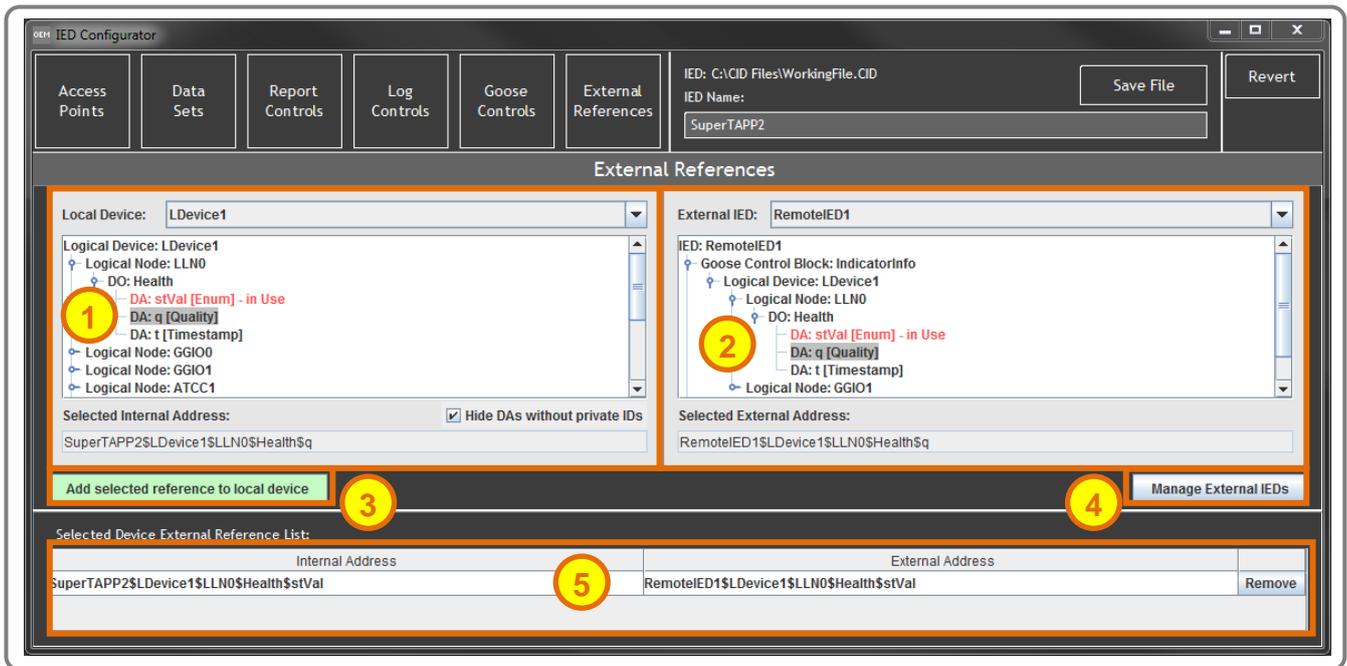


Figure 3-13 - External References

- 1 **Local Device Tree** – This section contains an IED structure tree with the *Logical Devices*, *Logical Nodes*, *Data Objects* and *Data Attributes* contained within the Local Device. *Data Attributes* currently in use will show in red.
- 2 **External IED Tree** – This section contains an IED structure tree with the Logical Devices, Logical Nodes, Data Objects and Data Attributes contained within the External IED. Data attributes currently in use will show in red.
- 3 **Add Selected Reference to Local Device** – This button is used to add the reference to the local device. It is only available to be clicked once matching *Data Attributes* from both the Local Device and the External IED are selected. This is discussed further in [3.7.1 Creating an External Reference](#).
- 4 **Manage External IEDs** – When left clicked, this button will show the *External IED Manager* window. This is discussed further in [3.7.2 External IED Manager](#).
- 5 **External Reference List** – Once a reference has been created, it will appear in the *External References List* this list shows both the internal address and the external address. It also contains an option to remove references.

3.7.1 Creating an External Reference

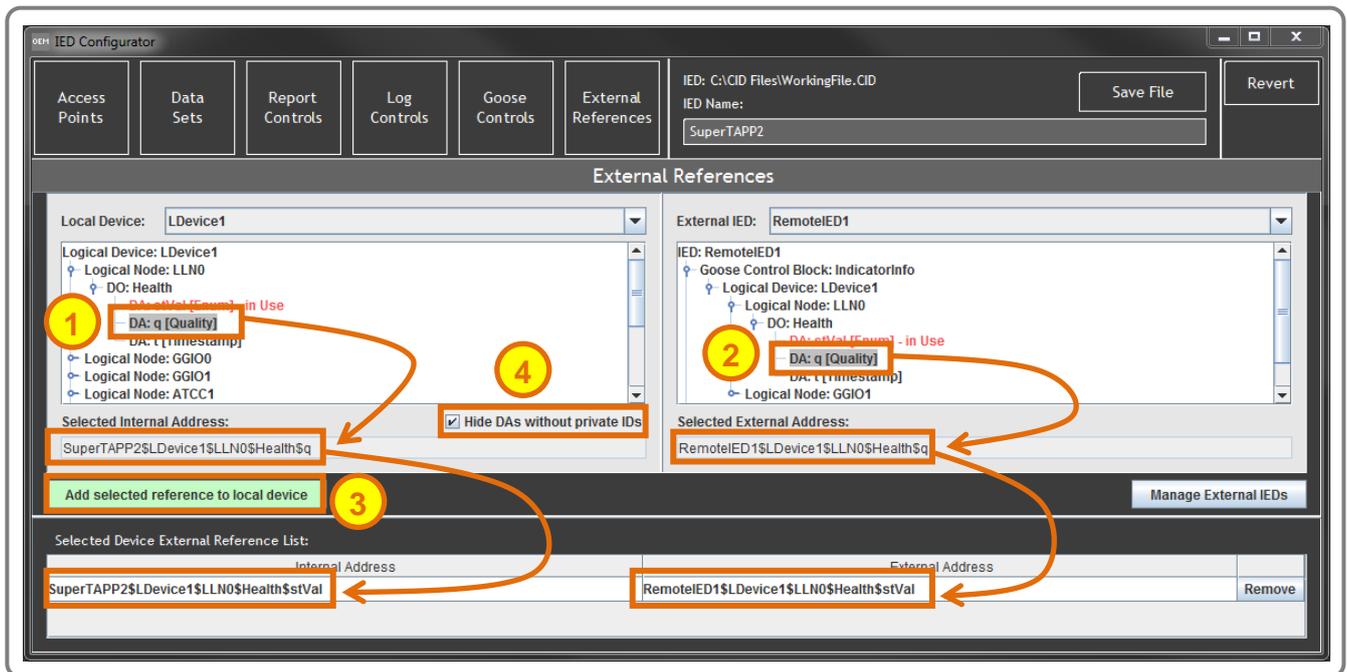


Figure 3-14 – Creating an External Reference

To create an external reference:

- A copy of the external IED being referenced must be included in the .cid file being configured. If this is not already included, it can be added using the external IED manager. See [3.7.2 External IED Manager](#).
- Find the required *Data Attribute* in the local device tree and left click to select. If the *Data Attribute* is shown in red text, then it is already in use and cannot be used for another reference.
- Once the internal reference is selected, find and select the relevant matching reference on the external IED. If the references are compatible, the *Add Selected Reference to Local Device* button will become green.
- Left click the *Add Selected Reference to Local Device* button to add the reference to the device.

- 1 Local Device Internal Reference** – When a Data Attribute is selected in the IED structure tree, its internal address is shown below the tree. Once the reference has been matched to an external reference and added to the local device, it will show in the external reference list.
- 2 External IED External Reference** – When a Data Attribute is selected in the IED structure tree, its external address is shown below the tree. Once the reference has been matched to an internal reference and added to the local device, it will show in the external reference list.
- 3 Add Selected Reference to Local Device** – This button is used when a matching internal and external address have been selected to be added to the local device. Once added they will show in the external reference list.
- 4 Hide DA's without private IDs** - Enabling this check box will hide all DA's without a private ID. Applications using the SystemCORP IEC61850 stack can only read values from points which have a private ID. This option will hide data attributes which cannot be read.

3.7.2 External IED Manager

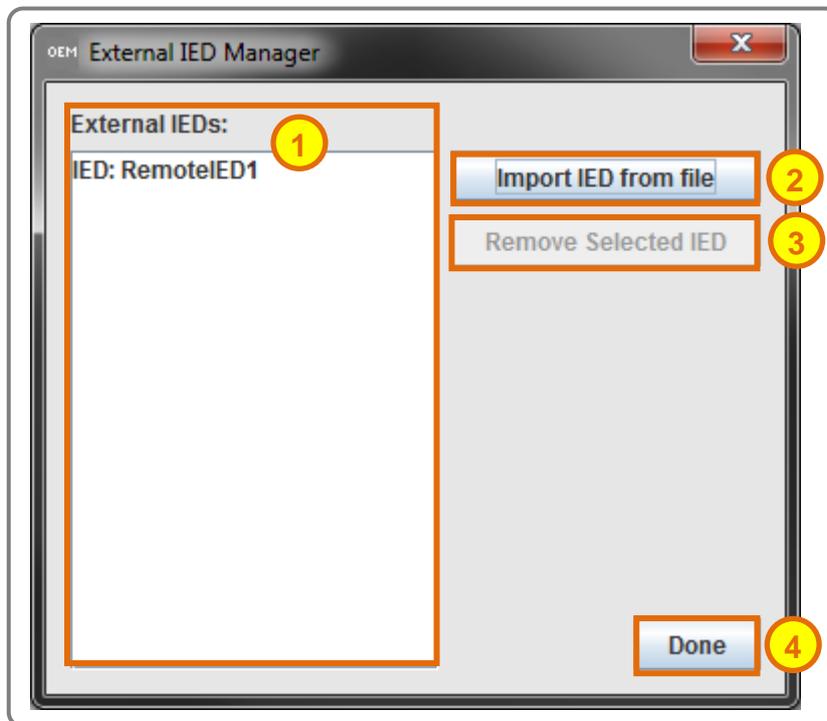


Figure 3-15 - External IED Manager

- 1 External IED list** – This is the list of external IEDs know by the device.
- 2 Import IED From File** – This button can be used to import a new IED from file. To reference external IED data attributes, a file for the IED must be imported. This file can be and *.icd*, *.cid*, *.scd* or *.ssd* file.
- 3 Remove Selected IED** – If it is unnecessary for an external IED to be listed. It can be removed. Left click the IED on the list to select and let click this button to remove.
- 4 Done** – This button will close the window and return the user to the *External References* view. The external IED list will be updated to reflect any changes to available IEDs.

End of Document